XXV.—*On the Dotted Vessels of Ferns.* By J. W. Griffith, M.D., F.L.S.

[With a Plate.]

During the examination of the petioles of some of the British Ferns, I have several times been led to doubt whether the dotted tubes found in them* have really been referred to their proper situation in structural classifications, and if their real functions have been properly understood. They are usually considered as forms of woody tissue.

These tubes are situated in bundles at tolerably regular distances from the axis and from each other, surrounded by the cellular system of the petiole. In the younger petioles they are mixed with spiral vessels, but these are rarely found in the older ones. Their transverse section shows them to be cylindrical or elliptical, not angular nor solid (Pl. V. fig. 1. *a*.). They are usually of a yellowish brown colour, terminating in acute extremities, which become more obtuse as their age advances. *In situ* their terminations overlap one another (fig. 3. *a*.). Their surfaces are studded with small elliptical markings or dots, not extending far across the tube, but arranged in parallel lines; these dots are rarely exactly opposite each other, so that the axis of any dot in one row rarely coincides with that of any other in the next. They have no tubular nor rimmed margin. On some of the torn edges projecting solid fibres may be seen leaving spaces between them corresponding to the dotted parts, and sometimes on their edges may be seen the fragments of the lacerated membrane filling up the dots, thus proving that these tubes are composed of two coats, one of united fibres, the other delicate and membranous. In the older petioles the tubes are often continuous at their extremities, but in the younger they are not. When these tubes are examined in the dried state the delicate membrane filling up the dot disappears, leaving a perfect foramen. The dots are situated obliquely on the walls of the tubes, so that if the upper and under surfaces be brought into focus under the microscope immediately after one another, or the focus of the object-glass be made to correspond to the centre of the tube so as to have both surfaces indistinct but still perceptible at the same time, the dots cross one another, showing their arrangement to be spiral. When they are stretched they do not break but uncoil (Pl. V. fig. 4. *a*.), as if the tube were formed by a band of four or five spiral fibres united at the margins. Their terminal points are situated on one side so as to make the end appear cut off obliquely. Sometimes there

* *Pteris aquilina* shows them remarkably well.

appears a black line extending along their surface and separating the rows of dots (fig. 4. *b.*). These tubes always contain air, except during their earliest periods. Tubes somewhat similar to these have been figured by Link* from ferns (*Aspidium*, *Polypodium*, &c.†), but they differ from those I have described in having a beaded margin and the dots being opposite each other.

These tubes are not true ducts, inasmuch as they uncoil without breaking, and contain air; they cannot be considered as any form of woody tissue for the last-mentioned reason, as well as because the dots have a spiral arrangement. They are not scalariform vessels, as their markings do not extend across the tube, nor are they angular. They agree with spiral vessels in, 1. terminating in pointed extremities; 2. containing air; 3. being composed of a fibre or fibres and a membrane; 4. uncoiling elastically. So that although not actually spiral vessels, in consequence of the edges of the fibres not being free but adherent, they are, I think, undoubtedly formed from them, and perform precisely the same physiological functions. This brings us to the question of the transformation of spiral into dotted vessels, which has been so often and so unprofitably discussed, inasmuch as even at the present time the highest authorities differ. I believe that all dotted tubes are not formed in the same way; thus, the reticulated tubes of flowering plants are formed on totally different principles from those of these ferns. I will not tire my readers by discussing this question, as it has been so often done by the best anatomists and physiologists. I will merely direct attention to the fact of the spiral vessels being found numerous in young petioles or stems, and being more rarely found, at least not in the same abundance, in the older ones; also to a beautiful microscopic object lately laid before the public by Mr. Kippist‡, I allude to the spiral cells (sp. vessels) found upon the testa of the seeds of *Acanthodium*, *Ruellia*, &c. When the surface of these seeds is examined by a lens of low power, it appears covered with whitish appressed hairs. These when moistened separate from each other and resolve themselves into spiral vessels which shoot out in the most beautiful manner from the surface. When they are minutely examined by a high power the spiral fibre is distinctly seen: at that extremity farthest from the testa the fibre remains simple (fig. 3.§); where (as in

* Ausgewählte anatomisch-botanische Abbildungen: Berlin, 1841.

† Not British species.

‡ Transactions of the Linnæan Society, vol. xix. p. 76.

§ The figures here alluded to are those accompanying Mr. Kippist's paper in the Linnæan Transactions.

fig. 2.) the tube has been stretched, the fibre breaks up into rings; and at that part nearest the testa where the pressure is considerable, the fibres at first are simply approximated; nearer still to the testa we have union of the fibres, and the reticulated duct produced.

August 9, 1842.

DESCRIPTION OF THE PLATE.

PLATE V.

Fig. 1. Transverse section of a bundle of dotted tubes from *Pteris*; *a*, the circular or elliptical orifices.
Fig. 2. Dotted tube from the same; *a*, conical termination.
Fig. 3. The same; *a*, overlapping extremities.
Fig. 4. The same, showing how the extended tube uncoils without breaking; *b*, the black line spoken of above.
Fig. 5. and 9. Show how the thicker portion when torn presents a ragged edge: this preparation was dried, and the thinner membrane deficient.
Fig. 6. Early dotted tubes from *Aspidium Filix mas.*
Fig. 7. Transverse section of bundle of tubes from *Pteris*: when the internal surface of the tube is brought into focus the transverse bars may be seen.
Fig. 8. and 9. Fibres withdrawn from the membrane in *Aspidium Filix mas.*

XXVI.—*The Birds of Ireland.* By WM. THOMPSON, Esq., Vice-Pres. Nat. Hist. Society of Belfast.

[Continued from p. 59.]

No. 13. *Hirundinidæ* (*continued*).

COMMON SWIFT, *Cypselus murarius*, Temm. Although this bird is common in favourite localities, the species must be set down with reference to Ireland generally as but partially distributed. Along the western range of the island it is rather scarce, and in some extensive districts is never to be met with.

The swift is more regular as to the time of its appearance around Belfast than any of the genus *Hirundo*. It may generally be seen during the first week of May, and frequently on the 2nd day of that month.

In his 'Illustrations of British Ornithology,' Mr. Selby observes, "It has been remarked that these birds delight in sultry weather, with approaching thunder-storms, at such times flying in small parties, with peculiar violence; and as they pass near steeples, towers, or corners of buildings, uttering loud screams, which White, in his 'Natural History of Selborne,' supposes to be a sort of serenade to their respective families. This is fanciful and pretty; but I should rather be inclined to reason the opposite way, and to consider this action and cry as the consequences of irritability, excited by the